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Wage Mobility in California: An Analysis of Annual Earnings

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“Key to sustained economic growth in California is providing a workforce development system that measures success not by how many people obtain services, but by how many people obtained jobs, or better-paying jobs by upgrading their skills.”

(Governor's Budget Summary, 2002-03, p. 55)

Executive Summary

Considerable concern has risen lately among researchers, economic planners, educators, and labor market policy makers regarding evidence of growing economic inequality. Recent research provides some evidence that disparities in income have grown between wealthier Californians and those of lesser means, based on cross-sectional analyses that offer a snapshot of the earnings distribution at different points in time. There are fewer studies of the earnings mobility patterns of individual workers, and no studies that specifically focus on California workers. There is a great deal of diversity within California's economy, and while many parallels with the national economy can be drawn, there are significant differences in the state's labor market, including greater levels of residential mobility, much larger shares of (primarily low-skill) immigrant workers, and a younger workforce. Given the demands of a state economy based on rapidly changing technologies and a skilled labor force, a longitudinal study of the wage and industry mobility of California workers may provide insights relevant to workforce development policy in the state.

The current report examines the wages of a large sample of California workers of all ages and income levels drawn

from administrative data collected by the California Employment Development Department (EDD). We examine the wage mobility of workers from 1988 to 2000, a period that encompasses the ending of the economic boom of the late 1980s, the recession of the early 1990s, and the longest peacetime economic expansion in both United States and California history.

Our results confirm that, when based on a cross-sectional analysis, real earnings have declined for the California workforce as a whole. However, we found a 24 percent increase in median earnings over the 12-year period for our longitudinal sample, likely reflecting the natural increase of earnings with age and experience and the value of maintaining a long-term attachment to the labor market. Earnings mobility rates were highest for the lowest wage earners, a finding that held across different analytical methods and different definitions of “mobility.” Broadly consistent with previous research, our results show that the highest wage earners are very successful at maintaining their level of earnings over time.

Not surprisingly, our analysis reveals that lower-paid workers are more likely to be employed in retail trade, agriculture and services, and less likely to be employed in durable manufacturing and transportation/utilities when compared to higher-paid workers. Also, workers employed in low-wage sectors who changed industries experienced higher percentage earnings gains than did those who stayed in the same industry. Workers leaving retail trade and the services sector, industries dominated by intermittent and part-time work, saw the largest earnings gains. However, because they had higher

initial earnings, those who continued to work in the same industry remained better off financially by 2000. This finding suggests that the workers who choose to change industries may do so because they are not finding sufficient opportunities for advancement in their current jobs, and that they are rewarded for their decision to switch industries with substantial percentage increases in their earnings. Consistent with recent research at the national level, our findings indicate that more workers in retail, agriculture and construction are remaining employed in these low-skill, low-wage sectors over time, suggesting a growing concentration of workers in low-wage industries in California.¹

We conclude from our analyses that individual workers saw significant gains in real annual earnings over the 1990s, with the largest increases at the bottom of the earnings distribution. It is not difficult to imagine the regulatory and economic forces that led to these gains. There were several increases in the minimum wage over that period, along with steady and significant declines in unemployment after the recession of the early 1990s. Together, these factors likely placed upward pressure on wages at the bottom of the distribution. However, it is important to remember that our analysis cannot distinguish the impact of hours of work on annual earnings. It is unclear how much of the increase in annual earnings may be related to increases in hours worked rather than increases in wages, particularly at the lower end of the earnings distribution. Even more importantly, the available data do not allow us to examine differences by age. The bottom of the earnings distribution is likely to be disproportionately composed of young workers, whose

wages would be expected to increase substantially as they complete their educations and gain work experience.

It remains to be seen what impact the current economic downturn will have on the earnings mobility of California's workforce. While our results indicate a positive trend in recent years, another study demonstrated that recent cohorts of workers have experienced less upward mobility than the previous generation, a finding that was particularly true for workers with lower levels of education and skills.²

Introduction

During the economic expansion of the 1990s, California's vibrant economy created hundreds of thousands of new jobs resulting in unprecedented low unemployment rates, particularly during the last three years of the recent economic boom. Yet, despite the low unemployment of recent years, research on income inequality suggests that disparities in income have continued to grow between higher-income Californians and those of lesser means. For example, the Public Policy Institute of California (PPIC) has concluded that income inequality in the state increased substantially over the past two decades, primarily as a result of a decline in real income among the poor.³ The PPIC attributes this decline to the immigration of low-skill workers and rising returns to education and skill.⁴

The PPIC research, like many other studies on the changing economic circumstances of the working poor, was based on cross-sectional data; that is, snapshots of the workforce at particular points in time. The results indicate that the poor as a group were worse off in recent years than in earlier times, but cannot necessarily be interpreted to mean that all low-income individuals and families have gotten poorer. In order to understand changes in the economic fortunes of individuals, it is necessary to conduct longitudinal analyses of individual workers' wages, tracking the earnings of the same individuals over time. The ability of low-income people to increase their employment earnings may have implications for the success of welfare-to-work programs and the likelihood of former welfare recipients achieving economic self-sufficiency. In addition, an understanding of how low-

wage workers can successfully increase their earnings may help policymakers better allocate resources for workforce development in California.

A body of research on wage mobility has been developed using data from national longitudinal surveys. While based on well-designed surveys providing extensive data on individual workers, the studies have not provided any separate analysis of the California workforce, which differs from that of the nation in significant ways. Also, most of the studies focus only on younger workers and tend to preclude generalizations about other workers whose low-wage status may pose more serious socio-economic concerns; for example, workers who have dependents to support.

What Does the Research on Wage Mobility Tell Us?

The majority of studies on wage mobility have used longitudinal data sets based on national-level surveys that contain (in addition to wages) demographic information such as age, gender, race, and the educational attainment of individual workers. A study using data from the Survey of Income and Program Participation found that 63 percent of workers who were earning the minimum wage in the mid-1980s were earning higher wages one year later; for those with gains, the typical rise was nearly 20 percent.⁵ A significant minority of workers, most of whom lacked a high school diploma or worked only on a part-time basis, did not advance beyond the minimum wage over the one-year period between the two surveys.

A more recent study tracked young workers over a 10-year period using the National Longitudinal Survey of Youth

(NLSY).⁶ The analyses showed that approximately eight percent of workers spent at least half of their first 10 post-school years working in jobs paying less than the minimum wage plus \$1.00. The authors found that, while the fraction of workers in minimum wage jobs went down significantly as the cohort aged, it never dropped to zero. Workers who were more highly educated and who lived in an urban area were more likely to advance beyond the minimum wage. Blacks and women were more likely than white males to spend a significant portion of their career in minimum-wage jobs.

Using data from the Current Population Survey, another study concluded that the young, the less educated, and blacks have more unstable earnings than do those who are older, more educated or white, with demographic factors having important effects on wage mobility.⁷ Specifically, women were more likely than men and blacks were more likely than whites to remain in the bottom quintile and less likely to remain in the top quintile of the overall earnings distribution.

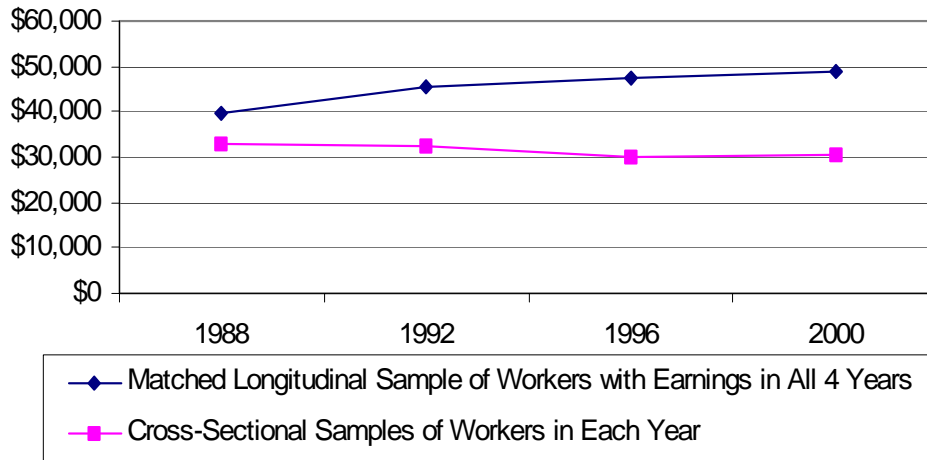
Another group of researchers compared the mobility patterns of two cohorts of male workers using NLSY data.⁸ Their analyses suggested that overall wage attainment among men has deteriorated over time. Median real wages for those in their early to late thirties declined by 21 percent for the 1979-94 cohort as compared to the 1966-81 cohort. Job instability increased and did not disappear once the young workers settled down; therefore, it was not just a legacy of job churning early in the career. In addition, this job instability was not limited to less educated workers.

This review of recent research on wage mobility finds consensus on several issues. First, most minimum-wage workers move on to higher-paying jobs fairly quickly, but some people seem to get trapped in low-wage employment. Those who are stuck in low-wage jobs are disproportionately female, black and less educated, and they are more likely to live outside of major urban areas.

Purpose of the Report

The studies reviewed in the previous section provide important information about wage mobility in the United States. They are based on well-designed national surveys that provide a wealth of information about the individuals studied. However, they are based on relatively small samples of workers, and do not allow for the separate analysis of the California labor market. This report attempts to address these limitations by tracking the wage mobility of a large sample of workers over a twelve-year period using administrative data collected by the California Employment Development Department (EDD). We drew a random sample of California workers from EDD data, and conducted our analyses on a matched subset of the sample containing wage records for workers who had annual earnings during each quarter of each of four years (1988, 1992, 1996 and 2000). Our analyses examine wage mobility patterns in an attempt to identify industries that tend to trap workers in a cycle of low-wage work as well as those career paths that are more successful in increasing earnings over time. Further details about our sample and methodology are described in the appendix.

Figure 1: Median Annual Earnings, 1988-2000 (2000 \$)



Staying in the labor market pays: findings reveal a 24 percent increase in real earnings over the 12-year period for the longitudinal sample, likely reflecting, at least in part, the value of maintaining a long-term attachment to the labor market.

Empirical Analyses

Real Annual Earnings Have Increased, Especially for Lower Wage Earners

Figure 1 displays median real annual earnings by year for the matched longitudinal sample, and for the cross-sectional samples of California workers representing the workforce as a whole in each year. As shown in the graph, median annual earnings have declined in real terms for the California workforce as a whole. Real earnings fell from \$32,801 in 1988 to \$30,462 in 2000, a decline of 7.1 percent. This finding is consistent with other studies that have shown declines in real income based on cross-sectional samples.

For the matched longitudinal sample, median real earnings grew from \$39,652 in 1988 to \$49,054 in 2000, an increase of approximately 24 percent.⁹ The difference in wage growth patterns likely reflects, in part, the greater attachment to the labor market and consistent employment record of this group of workers. It also reflects the natural tendency of individuals' earnings to increase over time with age and work

experience. Of course, not all workers experienced this substantial rise in earnings; approximately 30 percent of the sample showed a decline in real earnings. Another third of the workers had even more significant gains of more than 50 percent.

Mobility Rates Were Highest Among Those with the Lowest Earnings

We developed transition matrices to examine mobility among earnings quintiles¹⁰ and categories. The workers were classified into wage quintiles and categories based on their real annual earnings in 1988. Their wage quintile and category positions were then examined in 1992, 1996 and 2000.¹¹ We employed two measures of mobility by quintile. The first assessed our sample's mobility compared to the entire California workforce in each year ("absolute" mobility). The second method measured the shifts in the relative positions of earnings among the sample of workers over time ("relative mobility"). The appendix provides further explanations of these measures.

Table 1 summarizes the "absolute" earnings mobility of our sample, and

Table 1
Absolute Mobility Over 4-Year, 8-Year and 12-Year Periods by Quintile

1988 Earnings Status	Earnings Status in 1992			Earnings Status in 1996			Earnings Status in 2000		
	Same Quintile	Moved Up	Moved Down	Same Quintile	Moved Up	Moved Down	Same Quintile	Moved Up	Moved Down
Bottom Quintile	38.4	61.6	N/A	26.6	73.4	N/A	21.3	78.7	N/A
2 nd Quintile	40.0	51.5	8.5	33.0	58.2	8.8	28.2	62.4	9.4
Middle Quintile	45.7	42.7	11.7	37.8	48.7	13.5	33.4	51.1	15.5
4 th Quintile	54.1	33.5	12.5	45.2	39.2	15.6	39.0	41.7	19.3
Top Quintile	87.8	N/A	12.2	84.2	N/A	15.8	80.6	N/A	19.4

shows that it was very high. The first row of the table shows the mobility of those who were initially in the bottom quintile of the earnings distribution in 1988. Approximately 38 percent of these workers had earnings that still placed them in the bottom quintile in 1992. By 2000, one in five of these workers remained in the bottom quintile. At the other end of the distribution, workers in the top quintile in 1988 tended to be very successful in maintaining that position over time. Eighty percent of those workers were still earning wages in the top quintile twelve years later, suggesting that “earnings ‘affluence’ is

considerably more persistent than earnings ‘poverty.’”¹²

Table 2 presents the “relative” measure of mobility, which compares each individual’s position over time with others in the same longitudinal sample. This definition of mobility does not consider the natural tendency of earnings to increase as workers age to be an indicator of economic mobility. By this measure, there is somewhat less mobility, particularly for the highest and lowest earners in the group. As shown in the table, approximately half of the workers who had earnings in the bottom

Table 2
Relative Mobility Over 4-Year, 8-Year and 12-Year Periods by Quintile

1988 Earnings Status	Earnings Status in 1992			Earnings Status in 1996			Earnings Status in 2000		
	Same Quintile	Moved Up	Moved Down	Same Quintile	Moved Up	Moved Down	Same Quintile	Moved Up	Moved Down
Bottom Quintile	67.2	32.8	N/A	57.4	42.6	N/A	49.6	50.4	N/A
2 nd Quintile	49.3	26.5	24.2	40.3	31.4	28.3	35.6	34.9	29.5
Middle Quintile	47.7	23.0	29.3	37.8	26.9	35.3	31.8	28.9	39.3
4 th Quintile	53.7	17.8	28.5	44.4	19.7	35.8	37.8	20.0	42.2
Top Quintile	75.2	N/A	24.8	67.3	N/A	32.7	60.5	N/A	39.5

Table 3
Mobility Over 4-Year, 8-Year and 12-Year Periods by Earnings Category

1988 Earnings Category	Earnings Category in 1992			Earnings Category in 1996			Earnings Category in 2000		
	Same	Higher	Lower	Same	Higher	Lower	Same	Higher	Lower
Under \$12,000	30.7	69.3	N/A	20.2	79.8	N/A	15.5	84.5	N/A
\$12,000 to \$24,000	41.2	52.7	6.1	33.4	60.1	6.5	28.6	65.0	6.4
\$24,000 to \$36,000	44.4	44.4	11.2	36.3	50.9	12.8	31.8	54.0	14.2
\$36,000 to \$48,000	42.0	43.1	14.9	33.9	48.5	17.7	28.6	50.6	20.8
\$48,000 to \$60,000	38.8	43.8	17.4	30.8	47.7	21.6	25.6	49.0	25.4
\$60,000 to \$72,000	37.2	42.2	20.6	29.6	45.2	25.2	24.8	47.0	28.2
Over \$72,000	84.7	N/A	15.3	80.5	N/A	19.5	77.5	N/A	22.5

quintile in 1988 remained in the bottom quintile in 2000 relative to the positions of other workers in the sample. This measure results in a less optimistic view of earnings mobility. According to these results, a worker in the bottom quintile of the earnings distribution has approximately a 50-50 chance of moving up relative to other workers in the same cohort. Workers in the middle quintile are more likely to move down the earnings distribution relative to other workers than they are to move up.

For another view of mobility, we developed a third transition matrix showing the movement among earnings

categories over time. Table 3 shows earnings category positions in 1992, 1996 and 2000 as compared to the initial wage category in 1988. The first row of the table shows the mobility of those who initially earned annual wages in 1988 of under \$12,000 in inflation-adjusted terms (2000 \$). Of those whose 1988 earnings initially placed them in this category, over 30 percent still had earnings under \$12,000 in 1992. By 2000 the figure dropped to 15.5 percent. As was also shown in the quintiles matrices, the highest earners are very successful at maintaining their earnings, with more than 77 percent still earning over \$72,000 twelve years later.

The other 23 percent saw a decrease in their earnings placing them in a lower category.

“Border” issues limit any analysis of movement between quintiles of the earnings distribution or between earnings categories. For example, it could be concluded that workers with initial

Table 4
Earnings Growth Over 4-Year, 8-Year and 12-Year Periods by Quintile

1988 Earnings Status	Median Earnings in 1988 (2000 \$)	Median Earnings in 2000 (2000 \$)	Median Percent Change by 1992	Median Percent Change by 1996	Median Percent Change by 2000
Bottom Quintile	\$15,323	\$29,718	51.1	76.8	100.1
2 nd Quintile	\$28,119	\$36,115	16.7	23.3	28.4
Middle Quintile	\$39,720	\$46,500	10.9	14.4	17.0
4 th Quintile	\$53,627	\$59,802	8.3	9.5	10.6
Top Quintile	\$76,343	\$83,399	5.6	5.7	6.6

Table 5
Industry Distribution by Quintile
 1988 Wage Status

1988 Industry	Bottom Quintile	2nd Quintile	Middle Quintile	4th Quintile	Top Quintile
Agriculture	4.6%	3.0%	1.3%	0.7%	0.6%
Construction	3.4%	4.5%	4.7%	5.5%	6.1%
Transportation/ Utilities	2.9%	4.3%	7.0%	10.9%	9.8%
Wholesale Trade	5.0%	7.1%	7.2%	6.3%	5.8%
Retail Trade	30.2%	16.2%	10.9%	9.1%	5.2%
Business Services	5.7%	4.7%	3.9%	3.0%	3.5%
Health Services	6.0%	8.5%	7.5%	6.0%	5.2%
Education Services	9.3%	6.8%	8.4%	10.0%	9.9%
Other Services	13.6%	11.3%	10.5%	8.5%	9.7%
Non-Durable Manufacturing	5.4%	6.8%	7.2%	6.9%	5.2%
Durable Manufacturing	6.9%	13.9%	16.4%	18.8%	19.6%
Other Industries	7.2%	12.9%	15.0%	14.3%	19.7%

earnings placing them at the lower end of the bottom quintile experienced no “mobility” (i.e., movement out of that quintile) in spite of a substantial increase in earnings. At the same time, workers with initial earnings placing them at the top of the lowest quintile could demonstrate “mobility” into the next quintile with only a small increase in earnings. Therefore, for another view of mobility we calculated the percentage change in annual earnings by initial quintile.¹³ Table 4 shows the median change in earnings over the four-, eight- and twelve-year periods under study. Those in the bottom quintile experienced the highest percentage gains in earnings, doubling their real annual earnings over the twelve years.¹⁴ Workers at the bottom showed steady gains throughout the period, while those at the higher end saw most of their earnings gains by 1992.

Mobility Varies by Industry

To examine the possible variation in wage mobility by industry, we began by identifying the industries that employ the largest share of workers with an education level at or below the high school diploma (as an indicator of low skills).¹⁵ We examined the distribution of workers across these industries for each quintile of the earnings distribution in the initial year (1988). As shown in Table 5, approximately 30 percent of workers in the bottom quintile were employed in retail trade.

Workers at the bottom of the earnings distribution were also more likely to be employed in agriculture or other services as compared to workers higher in the earnings distribution. Workers in the top quintile of the earnings

Table 6
Earnings and Earnings Growth by Industry

1988 Industry	Median Earnings in 1988 (2000 \$)	Median Change by 2000
Agriculture	\$20,943	17.8
Construction	\$42,027	13.8
Non-Durable Manufacturing	\$37,139	10.3
Durable Manufacturing	\$44,036	14.2
Transportation/ Utilities	\$48,742	13.0
Wholesale Trade	\$36,979	19.2
Retail Trade	\$22,955	35.6
Business Services	\$30,868	35.8
Health Services	\$33,672	16.7
Education Services	\$39,849	23.3
Other Services	\$33,021	28.8
Other Industries	\$43,088	20.8

distribution were more likely to work in durable manufacturing, transportation/utilities and “other industries” as compared to workers at the bottom, and they were far less likely to work in agriculture or retail trade.

Next, we examined wage growth over the period 1988 to 2000 for workers in each industry. Table 6 summarizes median earnings in 1988 (in 2000 dollars) by industry, as well as the median percentage growth in earnings by 2000 for workers initially employed in those industries. Not surprisingly, median annual wages in 1988 were lowest for workers in agriculture and retail trade, and highest for workers in transportation/utilities, durable manufacturing and “other industries.” The median change in real earnings from 1988 to 2000 ranged from 10 percent for workers initially employed in non-durable manufacturing to nearly 36 percent for those employed in business

services and retail trade.

Decision to Change Industries Matters

The figures on wage growth shown in Table 6 apply to all workers employed in that industry in 1988, regardless of whether or not they remained in the same industry twelve years later. This may distort the view of wage growth experienced by workers in each industry. For example, according to the analysis in Table 6, workers employed in retail trade and business services in 1988 experienced a nearly 36 percent increase in real wages by 2000, a rate higher than for any other industry. However, workers in these industries include many young people working in retail sales or for temporary help agencies (included in business services) while pursuing education and training to prepare for careers in other industries. The high growth in earnings for these

Table 7
Real Earnings Growth by Industry from 1988 to 2000

Growth in Earnings for Those
Who Stayed in the Same Industry Growth in Earnings for Those
Who Changed Industries

Moving to a different industry is rewarding: workers who changed industries experienced higher wage gains than did those who stayed in the same industry.

1988 Industry	Median Earnings in 1988 (2000 \$)	Median Change by 2000	Median Earnings in 1988 (2000 \$)	Median Change by 2000
Agriculture	\$22,161	5.4	\$19,015	46.0
Construction	\$47,972	10.7	\$33,487	20.3
Non-Durable Manufacturing	\$40,599	8.6	\$32,920	13.6
Durable Manufacturing	\$47,620	15.1	\$38,983	11.9
Transportation/ Utilities	\$51,488	12.5	\$40,038	15.5
Wholesale Trade	\$43,413	13.5	\$32,053	25.0
Retail Trade	\$29,309	9.7	\$18,368	82.6
Business Services	\$37,503	26.9	\$28,311	40.3
Health Services	\$36,163	14.4	\$27,572	28.6
Education Services	\$42,401	22.2	\$27,462	43.9
Other Services	\$37,990	19.4	\$28,152	46.3
Other Industries	\$47,131	22.0	\$33,954	15.4

industries may reflect the wage growth experienced by workers moving to another industry sometime during the intervening years.

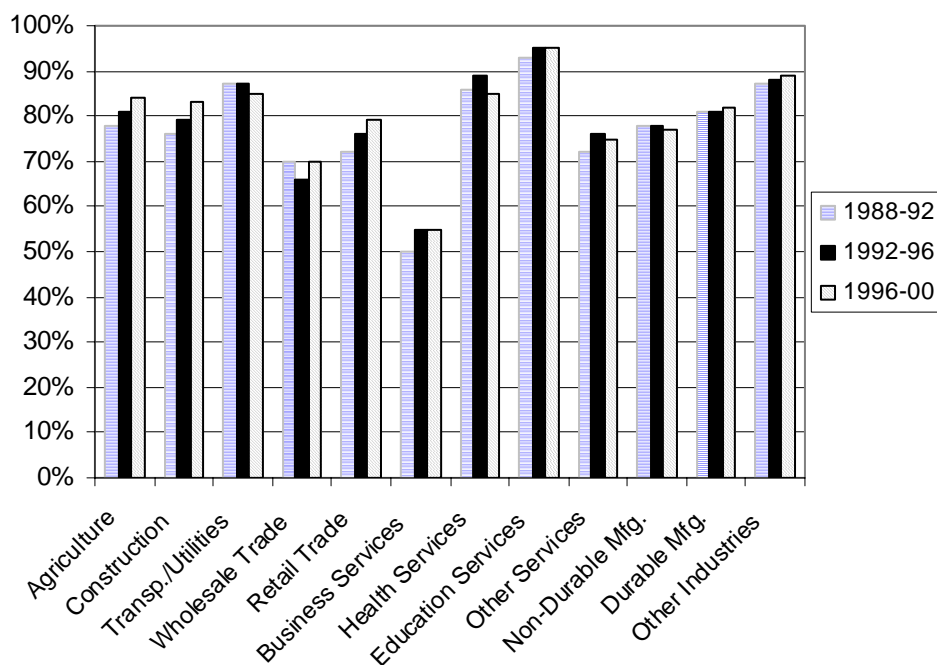
Table 7 presents the same analysis separately for workers who remained in the same industry in 2000 as compared to those who changed industries. Across all industries, the workers who remained in the same industry had higher earnings initially than those who changed industries. Workers who changed industries over the 12-year period experienced higher earnings growth, with the exception of those initially employed in durable manufacturing or “other industries.” The difference in wage growth was dramatic in some cases, particularly for agriculture¹⁶ and retail trade. Workers who remained in retail trade in 2000 saw real growth of less than 10 percent over the 12-year period, while those who changed industries saw growth in their earnings of nearly 83 percent. Those

who remained in agriculture experienced real earnings growth of approximately five percent, while those who moved to other industries saw their earnings grow by 46 percent. The differences were substantial for workers employed in services as well, with those changing industries experiencing about double the earnings growth of those who remained in the same industry. In spite of the higher rate of growth in earnings, workers who stayed in the same industry were generally better off at the end of the 12-year period because of their higher initial earnings level, with the exception of workers in retail trade and agriculture.

Growing “Stickiness” of Low-Wage Industries

It is a commonly held opinion that the worsening of the “low-wage trap” can be, at least partly, attributed to the growing concentration of low-wage careers in a handful of industries.¹⁷ We

Figure 2: Percentage of Workers Staying in the Same Industry



More workers in retail trade, agriculture and construction are remaining employed in these low-skill, low-wage sectors over time, suggesting a growing “stickiness” of low-wage careers in California.

examined the mobility of the disadvantaged segment of the California labor market by focusing on the ten industries employing the largest shares of workers with a high school diploma or less (as a measure of low skills). As depicted in Figure 2, an increasing percentage of workers in retail trade, agriculture, and construction, remained in the same industry over the three successive 4-year periods covered in our study. While the reasons for this finding are yet to be studied, this analysis does suggest a growing concentration of workers in these lower-wage industries in California.¹⁸

Conclusions

This study examined the earnings mobility of California workers over the period 1988 to 2000. Our results were largely consistent with research done using national samples. We found fairly high levels of absolute earnings mobility, with the highest rate of mobility among the lowest earners. Relative mobility was somewhat lower, particularly for those in the top and bottom quintiles, but was still substantial. In relative terms, about half of workers in the bottom quintile of the earnings distribution were likely to stay there even over a long period of labor market participation. Our results demonstrate that the highest earners are very successful at maintaining their level of earnings over time. In addition, while real median annual earnings declined for the California workforce as a whole, for the matched longitudinal sample median earnings increased substantially, likely due to the natural tendency of earnings to increase with age and to the value of maintaining a strong attachment to the labor market.

Our analysis of the differences in wage mobility by industry yielded several interesting results. Not surprisingly, we found that lower-paid workers were more likely to be employed in retail trade, agriculture and services, and less likely to be employed in durable manufacturing and transportation/utilities when compared to workers with higher earnings. Also, workers employed in low-wage sectors who changed industries experienced higher earnings gains over the 12-year period than did those who stayed in the same industry. Workers leaving retail trade and the services sector saw among the largest gains in earnings. However, with the exception of workers in retail and agriculture, those who remained working in their initial (1988) industry were still better off in 2000 because they had higher annual earnings initially. This finding suggests that the workers who choose to change industries may do so because they are seeking greater opportunities for advancement and wage growth. Our results indicate that they are rewarded for their decision to switch industries with substantial earnings increases.

On the other hand, our estimates reveal that, depending upon the industry, 55 to 81 percent of workers stayed in their initial (1988) industry of employment. This percentage has grown over the 12-year period for some industries employing larger shares of low-wage and low-skill workers. Specifically, an increasing proportion of low-wage earners can be found in retail trade, construction, and agriculture, suggesting a growing “stickiness” of low-wage careers in these industries.

Several regulatory and economic forces likely led to the earnings gains at the bottom of the distribution, including

increases in the minimum wage and significant declines in unemployment after the recession of the early 1990s. These factors combined likely placed upward pressure on wages at the bottom of the distribution. However, it is important to remember that our analysis cannot distinguish the impact of hours of work on annual earnings. Some of the increase in annual earnings may be related to increases in hours worked rather than increases in wages, particularly at the lower end of the earnings distribution. Also, the data do not allow us to examine differences in mobility by age, which are likely to be substantial.

It remains to be seen what impact the current economic downturn will have on the earnings mobility of California's workforce. While our results indicate a positive trend in recent years, other researchers have demonstrated that recent cohorts of workers have experienced less upward mobility than their counterparts entering the workforce a few decades ago, a finding that was particularly true for workers with lower levels of education and skills.

Appendix: Data and Methods

Our analyses are based on data extracted from EDD's Base Wage Database (BWDB) and ES-202 File. These data are reported on a quarterly basis by nearly all California employers for use in establishing entitlement to unemployment and disability benefits, and for collecting employment taxes for the state.¹⁹ The BWDB contains information on the quarterly wages of individual workers identified by their social security numbers. Although the BWDB lacks demographic information about individual workers, it still provides us with the ability to track the earnings of a large sample of individual California workers over a long period of time. The ES-202 file contains information on employers, including information on the nature of their business, as indicated by the Standard Industrial Classification (SIC) system. By matching the two databases,²⁰ we are able to identify the industry in which a worker is employed and relate this information to the worker's wage mobility.

Methodological choices regarding samples, time periods and measures of earnings and mobility can significantly affect the outcomes of particular studies. The analytical choices made in the current research are outlined below.

Time Period

The analyses are based on data for four years (1988, 1992, 1996, and 2000) covering a total time span of twelve years. The period 1988 to 2000 covered by this study encompasses the ending of the late 1980s economic boom, the recession of the early 1990s, and the longest peacetime economic expansion in both United States and California history. Thus, the economic era studied

here represents both good and bad economic times.

Sample

We drew a random five percent sample of records from the BWDB based on the last 2 digits of the social security number. We conducted the mobility analyses using a matched subset of the sample containing wage records for California workers who had positive annual earnings during each quarter of the four years included in the study, with a total sample size of 133,970.²¹ Thus the sample represents workers with a strong attachment to the labor market and a long-term history of work in California. For the industry analyses, we used a matched sample containing wage records for workers who had positive annual earnings during each quarter of both 1988 and 2000, with a total sample size of 187,274. The different criteria were used in order to ensure large enough sample sizes within each industry when examining movements among the industries over the 12-year period.

Earnings Measure

The data available in the BWDB are in the form of quarterly earnings paid to each individual by each employer. In cases where an individual had multiple employers, we summed across employers to create a measure of total quarterly earnings for each individual. We adjusted earnings for inflation to 2000 dollars using the quarterly Employment Cost Index (ECI).²² We then summed across quarters to obtain a measure of real annual earnings, which was used as the basis for our analyses. Data limitations did not allow us to identify the number of hours worked per week or the number of

weeks worked during the year. However, we tried to reduce the impact of partial-year employment by only including workers who had earnings in all four quarters of each year.

Mobility Measures

We employed several measures of mobility drawn from the research literature on wage mobility. We used two definitions of earnings mobility among quintiles, representing both absolute and relative mobility.²³ As a measure of absolute mobility, we assessed mobility relative to the California workforce as a whole, with the quintile breakpoints based on the entire sample of workers with earnings in all quarters of 1988 (N=448,811). These quintile breakpoints were adjusted for inflation using the ECI to determine the end-year quintiles (i.e., for 1992, 1996 and 2000). This measure defines mobility in relation to the earnings distribution in the workforce as a whole. It includes increases in earnings related to macroeconomic growth or life cycle changes as evidence of mobility.

As an alternative measure of mobility, we developed a second matrix representing “relative” mobility, or the shift in relative earnings over time among a fixed group of workers. For this measure, the annual earnings quintiles were based on the analysis sample (N=133,970) and were calculated for each year in real 2000 dollars. Changes in earnings due to aging or macroeconomic cycles are not considered true “mobility” in this kind of analysis.

We also developed a transition matrix showing mobility in real inflation-adjusted terms among different earnings categories. The lowest wage category was defined as annual earnings less

than \$12,000. This definition approximates the total annual earnings for someone working full time (35 to 40 hours per week) and earning the California minimum wage in 2000. Higher categories were defined in \$12,000 increments.

Industry Definitions

By matching wage records to employer records in the ES-202 file, we determined the industry of each worker’s primary job, defined as the job paying the highest total wages. As shown in Table 8, the distribution of our sample across industries was fairly representative of the distribution of all employment in California. The government sector was under-represented in the sample. Federal agencies are not required to report employment and earnings to EDD; so only state and local government employment is available in EDD data. The agriculture and trade sectors were also somewhat under-represented in the sample due, at least in part, to our restriction of the sample to people working all four quarters of each year.

Table 8
Distribution of Employment Across Industries

Industry	Employment in California, 1988	Employment in Sample, 1988
Agriculture	3.0%	1.8%
Mining and Construction	4.6%	4.3%
Manufacturing	17.1%	20.6%
Transportation/Utilities	4.8%	7.5%
Wholesale/Retail Trade	23.5%	19.3%
Finance/Insurance/Real Estate	6.3%	7.0%
Services	25.0%	31.9%
Government	15.8%	7.5%

These sectors are characterized by seasonal and intermittent employment, making it less likely that workers in these industries would meet the criteria of working all four quarters of the year. Employment was somewhat over-represented in the services, manufacturing and transportation/utilities sectors.

We targeted a number of specific industries to focus on in our analyses. We were particularly interested in examining industries characterized by a large number of low-skill workers. We began by selecting the ten industries that employ the largest share of workers with an education level at or below the high school diploma.²⁴ These ten industries included: retail trade; business services; non-durable manufacturing; health services; wholesale trade; transportation and public utilities; construction; agriculture; education services; and personal services. There were too few workers in personal services in the sample to allow for their separate analysis, so we combined them with workers in other service industries into the category "other services." We also separated the durable manufacturing sector. All other industries were combined into the category "other industries."²⁵

Limitations of the Data and Analyses

Several limitations in our data make it difficult to draw conclusions about the earnings mobility of specific groups of workers. With no data on the number of hours worked, we could not distinguish between earnings changes that reflected changes in wages, and those related to changes in hours worked. We were also unable to analyze differences in mobility by demographic

characteristics such as age, gender, race or level of education and work experience. Age data, in particular, would have allowed us to distinguish the earnings gains of younger workers from those with more experience and time in the labor market. Other research has demonstrated that younger workers are the most likely to experience large gains in earnings as they increase their hours of work and move into higher-paying jobs. We are attempting to obtain demographic information from other agencies that would allow us to analyze the impact of worker attributes on earnings gains in a future report.

In an attempt to minimize the influence on annual wages of less than full-time, full-year employment, we chose to include in our analyses only workers who worked all four quarters of each year. Thus, our sample represents workers who have maintained a strong attachment to the California labor market over a long period of time. The results may not be representative of workers with less attachment to the labor market or of industries characterized by seasonal employment patterns.

Our strict criteria for inclusion in the sample led to a substantial attrition rate between 1988 and 2000, a common issue in longitudinal studies. When matching records across the years, either 30 (for the 4-year match) or 42 (for the 2-year match) percent of the original workers²⁶ remained in the sample. Based on CPS data for California, we could expect to lose 44 percent of the original sample over 12 years due to retirement, migration out of the state or shifts to industries not included in the wage record data; causes not likely to bias the results. The additional 14 or 26 percent of workers

lost were likely employed fewer than four quarters in 2000 (or 1992 or 1996 for the 4-year match) due to intermittent employment patterns or temporary disability, or were discouraged workers who withdrew from the labor force. The loss of some of these workers from the sample might be expected to cause an underestimate of the number of workers with losses in earnings.

¹ While not a low-wage sector, the construction industry employs large numbers of people with lower levels of education, similar to the agriculture and retail industries.

² Bernhardt, A., Morris, M., Handcock, M. & Scott, M. (2001). *Divergent paths: Economic mobility in the new American labor market*. New York: Russell Sage Foundation.

³ Reed, D., Haber, M., & Mamesh, L. (1996). *The distribution of income in California*. San Francisco: Public Policy Institute of California.

⁴ Reed, D. (1999). *California's rising income inequality: Causes and concerns*. San Francisco: Public Policy Institute of California.

⁵ Smith, R., & Vavrichek, B. (1992). The wage mobility of minimum wage workers. *Industrial and Labor Relations Review*, 46(1), 82-88.

⁶ Carrington, W., & Fallick, B. (2001). Do some workers have minimum wage careers? *Monthly Labor Review*, 124(5), 17-27.

⁷ Gittleman, M., & Joyce, M. (1995). Earnings mobility in the United States, 1967-91. *Monthly Labor Review*, 118(9), 3-13.

⁸ Bernhardt, et. al. (2001).

⁹ Median wages were higher for the longitudinal sample in the initial year (1988), indicating that lower-wage workers comprise a smaller share of this group than of the entire population of workers. Lower-wage workers generally have more instability in their employment patterns, and are less likely to have been matched in all four annual files and included in our longitudinal sample. This does not mean, however, that our longitudinal sample contains few low-wage workers. Nearly 10,000 people in the matched sample, or approximately seven percent of the sample, had annual earnings of less than \$12,000 in 1988 (in real 2000 dollars), and another 22,000 people, or 16 percent, had earnings between \$12,000 and \$24,000. However, by following individuals who worked in all four quarters of all four years, we end up with a sample that has a disproportionate share of higher-wage workers as compared to the labor force as a whole, which is reflected in the higher median earnings.

¹⁰ Quintiles break the distribution into five equal sections, each containing 20 percent of the sample.

¹¹ Nominal earnings for each year were converted to real 2000 dollars using the Employment Cost Index for private industry in the western region (wages and salaries only).

¹² Daly, M., & Duncan, G. (1997). *Earnings mobility and instability, 1969-1995*. Federal Reserve Bank of San Francisco working paper 97, p. 12.

¹³ The quintile breaks were based on the analysis sample. The top and bottom one percent of wage earners were excluded to reduce excessive variation caused by workers with extremely high or low earnings.

¹⁴ The percent changes shown in Table 4 represent the median of the percent changes calculated for each individual (rather than the percent change in the median calculated for the group). Therefore, calculating 2000 wages using the 1988 wages and the percent change will not yield exactly the same figure as shown in the table.

¹⁵ As determined by the Current Population Survey for March 2000. The industry categories we use (excluding "other industries") employ more than 80 percent of workers with a high school education or less.

¹⁶ While we discuss results for agriculture in the report, caution should be used in drawing conclusions for this industry. Due to the seasonal nature of most employment in this sector and the presence of undocumented workers, the data are not representative of overall employment in the industry.

¹⁷ Bernhardt, et. al. (2001).

¹⁸ While not a low-wage sector, the construction industry employs large numbers of workers with limited education, making it similar in that respect to agriculture and retail trade.

¹⁹ The BWDB covers over 98 percent of all employment in the state with the exception of federal employees and the self-employed. It includes wages from work, and does not include any other non-employment sources of income such as social security, disability or welfare payments.

²⁰ The matching was based on a unique identifier for each employer in the state.

²¹ The average employment in California for the years studied was approximately 14.5 million. Our sample represents about one percent of total employment in the state, which far exceeds the sample sizes of other studies on wage mobility.

²² We used the ECI for private industry in the western region (wages and salaries only). We adjusted earnings using the ECI rather than the Consumer Price Index (CPI) because the ECI measures changes in the price of labor including wages and salaries, while the CPI measures changes in the price of goods and services. Because the ECI specifically measures changes in wages, the Bureau of Labor Statistics strongly recommends using the index when converting nominal wages to real wages. For more information on the ECI, see the BLS Handbook of Methods, April 1997, Chapter 8 (<http://stats.bls.gov/hom/homch8.pdf>).

²³ See, for example, Daly and Duncan (1997), and Sawhill, J. & McMurrer, D. (1996). *Economic mobility in the United States*. Washington, DC: The Urban Institute.

²⁴ As determined by the Current Population Survey for March 2000.

²⁵ The SIC codes included in each industry category are as follows: agriculture 01-09; construction 15-17; non-durable manufacturing 20-23 and 26-31; durable manufacturing 24, 25, and 32-39; transportation/utilities 40-49; wholesale trade 50-51; retail trade 52-59; business services 73; health services 80; education services 82; other services 70-72, 75-79, 81, 83-89; and other industries 10-14, 60-67, 91-97.

²⁶ i.e., those working four quarters of 1988